

CLAIMS

1. A security device comprising a substrate having a reflective portion which is provided with a raised line structure, the line structure defining a plurality of segments, 5 each segment being formed by a respective set of substantially parallel raised lines, the lines of at least three segments extending in different directions, each line being formed by or carrying an ink which does not extend fully into the spaces between the lines or which is sufficiently translucent between the lines so as not to obscure the reflective surface between the lines, wherein each segment causes incident light to 10 be reflected non-diffractively in a variable manner as the angle of incidence changes.
2. A device according to claim 1, wherein the substantially parallel lines within a segment are straight or curved.
3. A device according to claim 1 or claim 2, wherein the substantially parallel lines within a segment are discontinuous.
- 15 4. A device according to any of the preceding claims, wherein the substantially parallel lines of adjacent segments extend in different directions.
5. A device according to any of the preceding claims, wherein the substantially parallel lines within a segment have substantially the same width and/or height and/or pitch.
- 20 6. A device according to any of the preceding claims, wherein the segments have the same shape.
7. A device according to any of the preceding claims, wherein the segments define geometric shapes or alphanumeric indicia.
8. A device according to at least claim 6, wherein the segments defining the same 25 shape are nested one within the other.
9. A device according to claim 8, wherein the segments are rotated relative to one another.
10. A device according to any of claims 1 to 7, wherein a group of the segments are defined and arranged relative to one another so as to define an image such as a 30 geometric shape or alphanumeric indicia.
11. A device according to any of the preceding claims, wherein the segments abut one another.
12. A device according to any of the preceding claims, wherein the ink colour (or colours) is different from the colour of the reflective portion.

13. A device according to any of the preceding claims, wherein the raised line structure is embossed or debossed into the substrate.
14. A device according to claim 13, wherein parts of the lines are unlinked.
15. A device according to any of the preceding claims, wherein the reflective portion is formed by one of a foil, metallic ink, metallic coating, iridescent coating, glossy varnish, hologram or holographic coating.
16. A device according to any of the preceding claims, wherein the reflective portion is discontinuous.
17. A device according to any of the preceding claims, wherein the line widths are in the range of 10-300 microns, preferably 50-150 microns.
18. A device according to any of the preceding claims, wherein the space between adjacent lines is in the range 10-300 microns.
19. A device according to any of the preceding claims, wherein the line width to space ratio is typically 3:1 to 1:2, preferably 2:1.
20. A device according to any of the preceding claims, wherein the raised line structure extends beyond the reflective portion.
21. A device according to any of the preceding claims, wherein the reflective portion extends beyond the raised line structure.
22. A device according to any of the preceding claims, wherein the device further comprises a printed border.
23. A device according to claim 22, wherein the border is in register with the raised line structure.
24. A device according to claim 23, wherein the border and raised line structure have been printed using different parts of the same printing plate.
25. A device according to any of the preceding claims, wherein the substrate comprises one of uncoated paper, coated paper, and a plastic.
26. A device according to any of the preceding claims, wherein the substrate forms part of a document of value.
27. A document of value carrying a security device according to any of claims 1-25.
28. A document of value according to claim 27, wherein the security device is adhered to the document.
29. A device or document of value according to any of claims 26 to 28, wherein the document of value comprises a banknote.

30. A method of manufacturing a security device, the method comprising providing a reflective surface portion of a substrate with a raised line structure, the line structure defining a plurality of segments, each segment being formed by a respective set of substantially parallel raised lines, the lines of at least three segments extending in different directions, and providing each line with an ink which does not extend fully into the spaces between the lines or which is sufficiently translucent between the lines so as not to obscure the reflective surface between the lines, wherein each segment causes incident light to be reflected non-diffractively in a variable manner as the angle of incidence changes.
- 5 31. A method according to claim 30, wherein the lines are embossed, the embossing step being carried out using an intaglio plate having recesses defining the line structure which are filled with the ink.
- 10 32. A method according to claim 30 or claim 31, wherein the printing plate used to define the lines also defines a further image separate from the security device.
- 15 33. A method according to any of claims 30 to 32, for manufacturing a security device according to any of claims 1-29.
34. A security device comprising a substrate having a reflective portion which is provided with a raised line structure, the line structure defining a plurality of segments, each segment being formed by a respective set of substantially parallel embossed lines, the lines of at least five segments extending in different directions, wherein each 20 segment causes incident light to be reflected non-diffractively in a variable manner as the angle of incidence changes.
- 20 35. A banknote carrying a security device according to any of claims 1 to 29 or 34, or manufactured according to any of claims 30 to 33.